

Frequently Asked Questions (FAQ's) #2 for BAA 06-007
“Navigation in a GPS-denied environment”
16 March 2006

31. What is the exact scope of the BAA in terms of the CONOPS? For example, the BAA mentions urban areas and inside caves or buildings, but doesn't mention operations in an open area like the desert under a GPS-jammed environment. Can you please elaborate? We feel the desired CONOPS and operational conditions will dictate our solution.

A: We are concerned with GPS-denied environments, not GPS-jamming.

32. The BAA also specifically (and correctly) mentions RF propagation as being problematic underground and in buildings. Are you specifically looking for a non-RF solution, or are you looking for a solution that includes but is not limited to RF (like acoustic), or some other combination?

A: We are neither advocating nor dismissing a RF solution. However, there is still a need for team members to be able to exchange position information.

33. The BAA mentions beacons, but have you considered a system that can also use existing signals-of-opportunity i.e. television, radio, cell tower signals to augment the localization of ground units? Should such a capability be a key component of the end system? Or, should the system be completely self-contained (no non-cooperative signals)?

A: We are not dismissing nor advocating the use of signals-of-opportunity, but in proposing such an approach, one must make a case that such signals will be available and of sufficient strength and number to resolve position in GPS-denied environments, such as described in the BAA solicitation (Section 6.2 Program Plan, Desired Capabilities #6).

34. Is there a difference between the desired capabilities and goals? Are they all requirements (not sure I understand why they are separated into two different sections...what makes them different?)

A: A capability is a solution to the issue at hand. A goal is a long term desire that may not be present in the prototype, but the proposal should include a plan for achieving the goal.

35. What are you referring to on Pg7 when you refer to the "overall research objectives?" Is there some broader research objectives that are not mentioned or do you just mean the Goals section?

A: The overall research objectives are the Desired Capabilities and Goals listed in Section 6.2 Program Plan of the BAA solicitation.

36. The Goals and Desired Capabilities refer to a unit, 400cm³. Does this include the display system or can we use a separate PDA for display that doesn't count against the size/weight? Can the unit be multiple parts (to make the carrying easier) as long as the total weight/volume are not exceeded? Can we use separate antennas or does everything need to be in one box?

A: Multiple parts/items are acceptable. All items not normally carried by the warfighter count against the mass and volume limitations. If there are multiple items, consideration should be given to human factors issues.

37. Desired capability 12 talks about a military radio interface, will this always be used? And if so, on what frequency (or frequencies) could we expect it to be used (could possibly include this signal as a part of the position determination solution)?

A: A military radio will not always be available. Access to the radio should be provided in case node/cliue positions are to be transmitted to higher headquarters.

38. Desired capability 8 refers to encryption; are you talking about the text data output (item 10) or the RF links between the mobile units?

A: NSA Suite B should be considered for node to node (inside the cliue) information transfer.

39. Is a 3D position solution required or is 2D sufficient as long as it is within the 25m error budget?

A: In Section 6.2 Program Plan, Goal #2 refers to the Spherical Error Probability, therefore preference will be given to three dimensional (3D) position location with fallback to a two dimensional (2D) position location.

40. Are the Cover Page and Table of Contents counted as part of the 50-page limit?

A: The Cover Page and Table of Contents are not included in the 50 page limit.

41. Is there a current BAA project on Ad-Hoc Networking or Mesh Networking that your organization is working with which we can reference for our proposal or should we propose our own Ad-Hoc Networking Schema?

A: While there are many Ad-Hoc and Mesh Networking concepts available, you are not required to reference or utilize any of them.

42. Can you please clarify the answer on Question #14 for us from the FAQ?

A: GPS satellites currently transmit two data streams. The stream commonly used by individuals is known as CA-Code (Coarse-Acquisition). An encrypted data stream is available for military users and is known as P(Y)-Code. P(Y) capable receivers are not commonly available to the public, however, the messages coming from them are the same as from commercial receivers. As an end user, you will notice no difference other than better position resolution.

43. In a scenario of a cliue, is there any existing radio system identified to the soldiers which we can identify in our proposal? How many radios will be available within a cliue?

A: There are no existing military radio systems required for use in the proposal. Individual warfighters are not currently or consistently issued individual radios.

44. Is it anticipated that we will be using the current battlespace communications network for long-haul communications between cliques, and the higher level chain of commands? If so, is it expected that the system we develop integrate Land Mobile Radio functionality as well as data transport over voice coms networks?

A: It is not anticipated that we will find it necessary to utilize the battlespace communications network. This device is intended for personal use by individual warfighters.

45. Is a graphical map display similar to Falconview or FBCB2 desired? If so, is the use of a handheld computing device with this built in application part of the system proposed, or can we interface with the current units deployed in the field?

A: While a graphical display is considered to be advantageous, it is doubtful that the warfighter will ever require the substantial functionality of the packages cited. Any devices not normally carried by the warfighter are part of the system.

46. Are external antennas included in the size and/or weight requirements?

A: Yes, external antennas and cables are included in the mass and volume limitations.

47. Please clarify your answer to FAQ #28 you posted regarding the question “how key is the desire to power from a BA-5590 battery?”

A: ONR is interested in a battery no larger, heavier or of higher power capacity than the example listed. We would also like to stay away from proprietary batteries that are not in the US military inventory.

48. Is "Ethernet" from a previous response meant to convey only the interface to the radio, or is it meant to convey existence of an IP based wide-band radio net between members of the clique available for use?

A: The interface to the military radio may be assumed to be an ethernet connection. You are responsible for any communication between members of the clique.

49. If only an interface to the radio, will serial be an acceptable alternative?

A: Serial is acceptable only if the radio supports it.

50. Could you identify the likely military radio(s) of interest for interfacing to?

A: You may assume standard Marine Corp deployed inventory - primarily SINCGARS and EPLRS variants.

51. Please confirm answer provided in previous question #26 noting the primary intent of this effort as being the automated sharing among members of small teams / to avoid fratricide / to maneuver coordinated w/o explicit communications. This would appear to focus system solutions on the ability to exchange developed positions between participants as the key capability rather than extending the science of deriving the positions in the first place.

A: We consider the derived position/location information to be complementary to the ability to display it to the other members of the clique.

52. How many participants are expected to be communicating within the 1km radial area specified? Understand the minimum set of 5 systems is the low end - is there any high end number of participants targeted?

A: You may assume that 50 will be the maximum number of warfighters/nodes in a single clique. Multiple cliques may be operating in the same area.

53. Please clarify the maximum potential distance traveled by the intended user within the 8 hrs of operation and the 10km radial area mentioned.

A: 10 km linear distance - straight line or random walk.

54. Would multiple small boxes be an acceptable alternative to a single box solution as long as convenience and small size factors are maintained?

A: Yes. All pieces, including cabling, are to be included in the mass and volume limitations.

55. Is maintaining the accuracy requested more important in urban/inside structures/caves than in open terrain? Could the spec be relaxed for open terrain?

A: We believe that if you can achieve the accuracies requested in the urban/underground environments, you will have no trouble achieving similar accuracies in open terrain.

56. If the accuracy is maintained for relative positioning within the clique, but exceeds the limit for absolute accuracy, will this be acceptable?

A: That decision is within your design/trade space.

57. Does the accommodation to a standard military radio suffice for meeting any requirement for how far away the higher headquarters link is meant to be? (responsibility is on the radio therefore and not the system proposed).

A: The military radio is responsible for reach back to higher headquarters.

58. Is there a minimum and/or desired rate of position updating to be exchanged between participants and to the higher headquarters?

A: There are no pre-defined criteria for position/location information update transmission to higher headquarters under this BAA solicitation.

59. My first question is whether an FFRDC can be the prime?

A: No. A FFRDC cannot be a prime contractor for this BAA solicitation.

60. The second question has to do with ITAR restrictions regarding foreign nationals. In our team, we have no problem with ITAR restrictions, but another team member will not be able to accept the restrictions that bar foreign nationals. Our hope is that if as the prime, we can "filter" aspects of the technical development that are not sensitive to the team member to accomplish such that the overall technology is still subject to ITAR restrictions. Does this seem like a viable approach? If not, we may have to license the technology through a small spinoff company (which does already exist).

A: ITAR restrictions are applicable to subcontractors too.

61. My third question is that although the core capability behind our proposal is a "Personal Odometry System" which attaches to the individual soldier, we would like to propose a robotic component to this effort. Already our robots can go several hundred meters into underground bunkers and caves while maintaining accurate position accuracy. These small robots can automatically configure themselves into an optimal communication network to relay data out from the GPS denied arena. Is the robotic component of interest? Should it be proposed as an option?

A: You may propose a robotic component as a method of achieving the overall goals of this BAA solicitation. You may propose this in the Base effort or as an Option.